Amendments to the Claims

In the Claims:

24. (Currently Amended) A phase lock loop comprising:

a detector adapted to receive an input data signal;

a timing reference signal generator coupled to said detector; ~~and~~

a charge pump coupled to said detector including ~~, said charge pump comprising:first and second current sources;~~ first and second parallel current paths coupled at first ends to ~~said~~ a first current source and coupled at second ends to ~~said~~ a second current source, said first and second current paths having respective first and second output nodes; ~~a filter coupled to said first output node; a capacitor coupled to said second output node; and a feedback means coupled at a first input to said filter, at a second input to said capacitor, and at an output to one of said first and second current sources, said feedback means adapted to balance currents in said first and second current sources to minimize DC offset and glitch energy at a charge pump output node;~~ and

means for controlling a value of one of said first current source and said second current source to correct for a voltage difference between the output nodes of the two parallel current paths to minimize D.C. offsets resulting from parasitic capacitances.

25. (Original) The phase lock loop of claim 24, wherein said charge pump is implemented using CMOS technology.

26. (Currently Amended) The phase lock loop of claim 48 ~~24~~, wherein said feedback means is coupled to one of said first and second current sources via an adjusting current source.

27. (Currently Amended) The phase lock loop of claim 48 ~~24~~, wherein said feedback means is coupled directly to said first current source.

28. (Currently Amended) The phase lock loop of claim 48 ~~24~~, wherein said feedback means is coupled directly to said second current source.

29. (Currently Amended) The phase lock loop of claim <u>48</u> 24, wherein an adjusting current source is coupled between said feedback means and said first current source.

30. (Currently Amended) The phase lock loop of claim <u>48</u> 24, wherein an adjusting current source is coupled between said feedback means and said second current source.

31. (Currently Amended) The phase lock loop of claim <u>46</u> 24, wherein said filter is an analog loop filter.

32. (Currently Amended) The phase lock loop of claim <u>48</u> 24, wherein said feedback means is a transconductance amplifier.

33. (Currently Amended) The phase lock loop of claim <u>46</u> 24, wherein said filter comprises:

a resistor;

a first capacitor coupled in series with said resistor; and

a second capacitor coupled in parallel with said series resistor and first capacitor;

wherein an input to said feedback means is coupled to a node between said resistor and said first capacitor.

34. (Currently Amended) The phase lock loop of claim <u>47</u> 24, wherein said capacitor is a dump capacitor.

35. (Original) The phase lock loop of claim 24, wherein said first current path comprises:

a first switching device; and

a second switching device;

wherein said first output node is located between said first and second switching devices.

36. (Original) The phase lock loop of claim 35, wherein said first and second switching devices are transistors.

37. (Original) The phase lock loop of claim 24, wherein said second current path comprises:

  a first switching device; and

  a second switching device;

  wherein said second output node is located between said first and second switching devices.

38. (Original) The phase lock loop of claim 37, wherein said first and second switching devices are transistors.

39. (Currently Amended) A method of controlling a charge pump, the method comprising the steps of:

  detecting an input signal and a timing reference signal with a detector, said detector then outputting a pump-up and pump-down signal;

  receiving said pump-up and said pump-down signal at a charge pump;

  transmitting said pump-up and said pump-down signals through first and second parallel current paths that are coupled between first and second current sources in said charge pump;

  detecting a voltage difference between the outputs nodes of the two parallel current paths; and

  controlling a value of one of said first current source and said second current source to correct for the voltage difference to minimize D.C. offsets resulting from parasitic capacitances of said transistors

  outputting a first current path output signal from said first current path to a filter, said filter producing a filter output signal;

  outputting a second current path output signal from said second current path to a capacitor;

  receiving said filter output signal and said second current path output signal at inputs of a feedback means, said feedback means generating a feedback output signal; and

~~balancing currents in said first and second current sources using said feedback output signal to minimize D.C. offsets and glitch energy.~~

40. (Currently Amended) The method of claim 49 ~~39~~, further comprising the step of directly adjusting said first current source with said feedback output signal.

41. (Currently Amended) The method of claim 49 ~~39~~, further comprising the step of directly adjusting said second current source with said feedback output signal.

42. (Currently Amended) The method of claim 49 ~~39~~, further comprising the steps of:

receiving said feedback output signal at an adjusting current source; and

performing said balancing of said current in said first and second current sources via said feedback means and said adjusting current source.

43. (Original) The method of claim 42, further comprising the step of coupling said adjusting current source directly to said first current source.

44. (Original) The method of claim 42, further comprising the step of coupling said adjusting current source directly to said second current source.

45. (Currently Amended) A method of controlling a charge pump having two parallel current paths formed of transistors, each current path having an output node and coupled between a first current source and a second current source, said charge pump operating within a phase lock loop, the method comprising the steps of:

detecting a phase or frequency characteristic of an input signal to produce an output signal;

receiving said output signal at said charge pump and using said output signal to produce a charge pump control signal;

generating a characteristic current using one of said first current path and said second current path in response to said charge pump control signal;

detecting a voltage difference between the outputs nodes of the two parallel current paths; and

controlling a value of one of said first current source and said second current source to correct for the voltage difference to minimize D.C. offsets resulting from parasitic capacitances of said transistors.

46. (New) The phase lock loop of claim 1, wherein the means for controlling comprises a filter coupled to said first output node.

47. (New) The phase lock loop of claim 1, wherein the means for controlling comprises a capacitor coupled to said second output node.

48. (New) The phase lock loop of claim 1, wherein the means for controlling comprises a feedback means coupled at a first input to a filter coupled to said first output node, at a second input to a capacitor coupled to said second output node, and at an output to one of said first and second current sources, said feedback means adapted to balance currents in said first and second current sources to minimize DC offset and glitch energy at a charge pump output node.

49. (New) The method of claim 39, wherein the detecting step comprises:

outputting a first current path output signal from said first current path to a filter, said filter producing a filter output signal;

outputting a second current path output signal from said second current path to a capacitor; and

receiving said filter output signal and said second current path output signal at inputs of a feedback means, said feedback means generating a feedback output signal.